

REMARKS

In the Office Action, the Examiner noted that claims 1-20 are pending in the application, and claims 1-20 stand rejected.

Rejections under 35 USC §103

Claims 1-20 were rejected under 35 USC §103 as being unpatentable over Gongwer (US Patent No. 4,377,982) in view of Loewy et al. (US Patent No. 5,366,176). The Applicants submit that the Examiner has not established a prima facie case of obviousness.

With respect to Claims 1 and 2, neither Gongwer nor Loewy disclose or teach of a missile or aircraft with at least one activatable flow effector on the missile or aircraft afterbody; or at least one sensor being positioned to detect a force or flow condition on the missile or aircraft afterbody. Gongwer describes the use of drag pins for steering control of a spherical body. Gongwer states his invention applies to an underwater vehicle, a lighter-than-air vehicle or a manned submarine vehicle. Gongwer Abstract. The present invention relates to a missile or aircraft comprising an afterbody and forebody. The Applicants contend that the spherical vehicle in Gongwer has no forebody or afterbody. Unlike more cylindrical shaped vehicles such as a missile, torpedo, aircraft or submarine, a spherical vehicle has no natural front or rear. Gongwer further has no control surfaces, which would differentiate the fore and aft portions of the vehicle. Additionally, as the Examiner noted Gongwer in the Office Action does not provide at least one sensor being positioned to detect a force or flow condition on the missile or aircraft afterbody. Loewy also clearly doesn't provide for at least one activatable flow effector on a missile or aircraft afterbody. In addition, Loewy doesn't provide a pressure sensor for detecting a force or flow condition on the missile or aircraft afterbody as the Examiner suggests, but rather a motion sensor which monitors the flap motion on the aircrafts control surface, whose signal a microprocessor uses to compare differences between the desired pitch and actual pitch of the control surface.

With respect to Claim 3, additionally neither Gongwer nor Loewy teach of using a closed loop control system to operate a flow effector by oscillation.

With respect to Claim 4, additionally neither Gongwer nor Loewy teach of using a closed loop control system to operate at least two flow effectors in a pattern.

With respect to Claim 5, additionally neither Gongwer nor Loewy teach of using a closed loop control system to operate a flow effector by oscillation.

With respect to Claim 6, additionally neither Gongwer nor Loewy teach of an aircraft or missile where the at least one activatable flow effector is a plasma actuator.

With respect to Claim 7, additionally neither Gongwer nor Loewy teach of an aircraft or missile where the at least one activatable flow effector is located on a tail fin or boattail of a missile or aircraft.

With respect to Claim 8, neither Gongwer nor Loewy disclose or teach of a flow control system for a missile or aircraft afterbody with at least one activatable flow effector; or an inertial measurement unit having an output which is used in part for activating and deactivating the at least one activatable flow effector. Again, Gongwer describes the use of drag pins for steering control of a spherical body. Gongwer states his invention applies to an underwater vehicle, a lighter-than-air vehicle or a manned submarine vehicle. Gongwer Abstract. The present invention relates flow control system for a missile or aircraft afterbody. The Applicants contend that the spherical vehicle in Gongwer has no forebody or afterbody. Unlike more cylindrical shaped vehicles such as a missile, torpedo, aircraft or submarine, a spherical vehicle has no natural front or rear. Gongwer further has no control surfaces, which would differentiate the fore and aft portions of the vehicle. Additionally, as the Examiner noted Gongwer in the Office Action does not provide an inertial measurement unit having an output that is used in part for activating and deactivating the flow effector. Loewy also clearly doesn't provide for flow control system with at least one activatable flow effector for a missile or aircraft afterbody. In addition, Loewy doesn't provide an inertial measurement unit with an output for controlling the at least one activatable flow effector on the missile or aircraft afterbody, but rather a motion sensor which monitors the flap motion on the aircrafts control surface, whose signal a microprocessor uses to compare differences between the desired pitch and actual pitch of the control surface.

With respect to Claim 9, additionally neither Gongwer nor Loewy teach of using a flow control system comprising at least two activatable flow effectors, and a closed loop control system to operate at least two flow effectors in a pattern.

With respect to Claim 10, additionally neither Gongwer nor Loewy teach of using an activatable flow effector capable of being activated and deactivated at frequencies of at least 20 Hz.

With respect to Claim 12, additionally neither Gongwer nor Loewy teach of using of using a closed loop control system to create in part a yawing moment on the missile or aircraft.

With respect to Claim 13, additionally neither Gongwer nor Loewy teach of using of using a closed loop control system to create in part a pitching moment on the missile or aircraft.

With respect to Claim 14, additionally neither Gongwer nor Loewy teach of using a closed loop control system to create in part a rolling moment on the missile or aircraft. Gongwer does teach of using an activatable flow effector to affect water flow. However, Gongwer doesn't teach of a closed loop control system, and limits use of the activatable flow effectors to counteract the shaft torque created by the impeller and does not create a roll.

With respect to Claim 15, neither Gongwer nor Loewy teach the steps of a method of maneuvering a missile or aircraft including those of b) estimating or determining forces or flow conditions on the missile or an aircraft afterbody based at least in part on a signal from at least one sensor, which is positioned to detect side forces or flow separation on the afterbody; and c) deactivating the at least one activatable flow effector in response to changed side forces or flow conditions.

With respect to Claim 16, additionally neither Gongwer nor Loewy teach a method of maneuvering wherein the at least one activatable flow effector is activated by oscillation.

With respect to Claim 17, additionally neither Gongwer nor Loewy teach a method of maneuvering comprising at least two activatable flow effectors wherein a closed loop control system activates and deactivates the at least two activatable flow effectors in a pattern.

With respect to Claim 18, additionally neither Gongwer nor Loewy teach a method of maneuvering wherein the at least one activatable flow effectors is activates and deactivates to create in part a rolling moment on the missile or aircraft.

With respect to Claim 19, additionally neither Gongwer nor Loewy teach a method of maneuvering wherein the at least one activatable flow effectors is activates and deactivates to create in part a yawing moment on the missile or aircraft

With respect to Claim 20, additionally neither Gongwer nor Loewy teach a method of maneuvering wherein the at least one activatable flow effectors is activates and deactivates to create in part a pitching moment on the missile or aircraft

Furthermore in addition to the above comments, the Applicants further submit that the Examiner has not given any reason, suggestion, or motivation in either Gongwer and Loewy et al., or from these references cited as a whole for the person of ordinary skill to have combined or modified these references. The Applicants submit that obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching suggestion or incentive supporting such combination. If such suggestion or incentive is in the references, the Applicants respectfully request that the Examiner particularly point out the relevant sections of those references cited which suggest or motivate his combination of those references. If the Examiner is alleging that a person of ordinary skill would have be motivated to combine such references, the Applicant respectfully submits that how a person of ordinary skill in the art would have been motivated must be in the personal knowledge of the Examiner, and therefore respectfully requests that the Examiner in his next Official Action submit an affidavit detailing as specifically as possible such motivation (see 37 CFR §1.104 (d) (2)). Given the reasons in this response, the Applicants respectfully request withdrawal of this rejection.

CONCLUSION

For all the above reasons the Applicants respectfully submit that the application is in condition for allowance and that action is earnestly solicited.

Respectfully submitted,

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Dated



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